



## EFFECT OF PRANAYAMA ON HUMAN WELLBEING: A SCIENTIFIC STUDY

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### ABSTRACT

Pranayama is considered as an essential component of Yoga which is said to influence the physiological systems. Advantageous effects of yogic breathing on the neurocognitive, psychophysiological, respiratory, biochemical and metabolic functions in healthy individual were elicited. Over all, yogic breathing could be considered safe, when practiced under guidance of a trained teacher.

### 1) INTRODUCTION

Yoga is a traditional practice form the ancient Indian culture and is considered to be the science of holistic living various practices involved in the tradition of Yoga include: Yama, Niyama, Asana, Pranayama, Prathyahara, Dharana, Dhyana and Samadhi. Pranayama or breath regulation has been greatly emphasized in Yoga and has drawn special attention from the scientific community.

thus it's also given special emphasis in yogic texts. The effects of Yogic breath regulation on modulation of autonomic function (AFT) have been studied extensively. The studies on Yogic breathing assessing the AFT.

### 2) Name of the Practice

- 1) Kapalabhati
- 2) Bastrika
- 3) Nadishodhana
- 4) Suryanuloma Viloma
- 5) Chandranuloma Viloma
- 6) Suryabhedana
- 7) Ujjayi
- 8) Bhramari

**3.1 Neurocognitive effects of Yogic breathing.** Ancient Indian texts on Yoga describe, "As the breath moves so does the mind & mind ceases to move as the breath is stopped." An early review indicated that Yogic breathing practices could influence the brain activity in different ways.

**3.1.1 Changes with Bhramari Pranayama:** Bhramari Pranayama (Female honey bee) humming breath, which is said to modify the brain responses through resonance produced by the humming sound has shown to cause not epileptic paroxysmal gamma waves in the EEG.

**3.2:- Psychophysiological effects of Yogic breathing:** Human respiration is the only physiological system that is under both autonomic & voluntary nervous control and

**The neurocognitive effect of Yogic breathing.**

S. No	Author	Year	Sample Size	Variables student EEG	Findings.
1	Stancák et al.	1991	11	EEG	Alpha activity was increased during the initial 5 min of <i>Kapalabhati</i> (KPB). Theta activity was increased during later stages of 15 min
2	Telles et al.	1993	11	Middle Latency Auditory Evoked Potential	Na-wave amplitude increased and latency decreased during the period of pranayamic practice,
3	Jella & Shannahoff	1993	51	Spatial and verbal task performance	Spatial task performance was significantly enhanced during pranayama activity.
4	Vialatte et al.	2008	18	EEG	Non-epileptic paroxysmal gamma waves were generated during the practice of <i>Bhramari Pranayama</i> .
5	Bhavanani et al.	2012	34	VRT and ART	There was reduction in VRT and ART following 9 rounds of <i>Mukha Bhastrika</i> among mentally challenged children.
6	Telles et al.	2013	90	Blood pressure	There was reduction in systolic and diastolic blood pressure following <i>Nadishuddhi</i> and <i>Kapalbharti Pranayama</i> .
7	Rajesh et al.	2014	31	Stop Signal Task	Reduction in stop signal reaction time was found with 10 min of practice of <i>Bhramari Pranayama</i> .

**3.3 Effect of Yogic breathing on Respiratory system:**

The training in yogic breathing is found to be an effective means of enhancing the pulmonary functions. Slow breathing at 6 breaths/min showed an increase in vital capacity (VC) after 2 and 5 min.

A recent study demonstrated beneficial effect of one month training in combination of yogic breathing on pulmonary functions in competitive swimmers.

**Summaries of Psychophysiological changed following Yogic Breathing.**

S. No	Author	Year	Sample size	Variables Studies	Findings.
1	Stancák et al.	1991	18	BP, ECG and respiration	Increase of Heart rate (HR), SBP and DBP during <i>Kapalabhati</i> . BRS reduced during <i>Kapalabhati</i> .
2	Pal et al.	2004	66	Autonomic Function tests	The increased parasympathetic activity and decreased sympathetic activity were observed in slow breathing group after 3 months,
3	Shannahoff-Khalsa et al.	2004	4	Cardiovascular variables	Following breathing at 1 breath/min with ratio of 20:20:20 s, there are dramatic variations in hemodynamic variables.
4	Veerabhadrapa et al.	2011	50	Cardiovascular autonomic reactivity	<i>Mukh Bhastrika</i> training showed an increase in parasympathetic activity
5	Turankar et al.	2013	68	BP, Pulmonary function tests	Practice of <i>Anulom Vilom Pranayama</i> with reduce HTN & improve Pulm Function.
6	Hakked et al.	2017	27	Spirometry	Training in Yogic Breathing for one month enhance lung functions in professional swimmers.

**3.5 Yogic Breathing in Cardiovascular Diseases:-** The Physiological effects of Yogic breathing practices observed through various experiments correlating with the traditional textual understanding, have been used in various clinical set ups. Following *Sukha Pranayama* for 5 min at 6 breaths (Min), there was significant reduction in HR (Heart rate, systolic BP, Pulse Pressure mean material pressure etc.

A Study demonstrated the beneficial effects of the practice of pranayama in patients with cardiac arrhythmia, demonstrating improvements in QTd, QTc-d, JTD and JTC-d in the ECG following the pranayama session, indicating reduction in the indices of ventricular repolarization dispersion.

**Biochemical and Metabolic changes following Yogic Breathing.**

S. No	Author	Year	Sample size	Variables studied	Finding.
1	Pratap	1978	10	Arterial blood gas	No significance changes in arterial blood gases were noted after Pranayama.
2	Desai & Gharote	1990	12	Blood Urea, Creatinine, tyrosine	Decrease in blood urea, increase in creatinine and tyrosine after 1 min of Kapalabhati
3	Telles & Desiraju	1991	10	Oxygen consumption	An increase in oxygen consumption was noted in Yoga breathing with short kumbhaka and a reduction with prolonged kumbhaka.
4	Bhattacharya et al.	2002	60	SOD, Free radicals	The free radicals were decreased significantly following practice of Pranayama but the SOD was increased

**CONCLUSION**

Pranayama or Yogic breathing practices were found to influence the neurocognitive abilities, autonomic & pulmonary functions as well as the biochemical & metabolic activities in the body. The studies in the clinical populations, show the effects of Yogic breathing in modulating cardiovascular variables in patients with hypertension and cardiac arrhythmias, relieving the symptoms & enhancing the pulmonary functions in bronchial asthma, as an ancillary aid to modify the body weight and symptoms of pulmonary tuberculosis, to enhance mood for patients with drawing from cigar cigarette smoking to manage anxiety and stress in students, to modulate the pain perception, improve the sympathetic activities in patients with diabetes, reduce the cancer related symptoms and enhancing the antioxidant status of patients undergoing radiotherapy and chemotherapy for cancer. Thus the cost effective & safe practices of Yogic breathing could aid in prevention & management of various communicable diseases. They may also play a role in management of communicable diseases such as pulmonary tuberculosis.

Over all, we found the practices of yogic breathing safe, when practiced under guidance of a trained teacher. Though several studies are available elucidating the effect, of yogic breathing they lack methodological rigor. Considering the positive effects of yogic breathing, further large scale studies with better methodological designs to understand the mechanism involved with Yogic breathing are warranted.

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